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Studies in the North American Convolvulaceae. III. *Calycobolus*, *Bonamia*, and *Stylisma*

HOMER DOLIVER HOUSE

The *Dicranostyleae*, to which belong these three genera together with *Cressa* and *Evolvulus*, is characterized by bifid styles and these divisions sometimes again cleft, as in *Evolvulus*, valvular and usually 2-celled, 2-4-seeded capsules. The genus *Calycobolus* (*Prevostea*) has been placed in the *Poraneae* by Hallier, but the characters of the style and capsule in *Calycobolus* are those of the *Dicranostyleae*, while the only character which it has in common with *Porana* is the inequality of the sepals. The genus *Dicranostyles* Benth. is represented in northern South America by *D. scandens* Benth., and the closely allied genus *Lysiostyles* Benth. by *L. scandens*.

Key to the North American genera of *Dicranostyleae*

- Outer sepals enlarged, often colored or otherwise different from the inner sepals. 1. CALYCOBOLUS.
Sepals alike or nearly so.
Divisions of the style entire; stigmas 2; corolla funnelform.
Stamens included.
Plants comparatively stout; sepals leathery, rounded or obtuse. 2. BONAMIA.
Plants slender; sepals herbaceous, acute or acuminate. 3. STYLISMA.
Stamens exserted. 4. CRESSA.
Divisions of the style each 2-cleft; stigmas 4. 5. EVOLVULUS.

1. CALYCOBOLUS Willd.; R. & S. Syst. 5: 4. 1819

Twining or suberect, herbaceous or woody plants. Leaf-blades petioled, entire, rarely cordate. Flowers in axillary clusters. Sepals unequal, the outer ones enlarged and differing from the inner in texture, shape, color and sometimes insertion. Stamens included; filaments dilated and pubescent at the base. Ovary 2-celled, 4-ovuled. Style bifid nearly or quite to the ovary, the divisions unequal. Stigmas 2, small, capitate. Capsules ovoid. Seeds smooth or pubescent.

Type species : *Calycobolus emarginatus* Willd. *l. c.* = *Dufourea sericea* H.B.K. = *Prevostea sericea* Choisy.

Dufourea H.B.K. Nov. Gen. & Sp. 3: 113. 1818. Not *Dufourea* Bory, 1810.

Prevostea Choisy, Ann. Sci. Nat. 4: 497. 1825. — Mém. Soc.

Phys. Genève. 6: 492. 1833. — In DC. Prodr. 9: 437. 1845.

Reinwardtia Spreng. Syst. 1: 527. 1825. Not *Reinwardtia* Dum. 1822.

Wilberforcia Hook. f.; Planchon, in Hook. Ic. pl. 796. 1848.

At least eight species are known, two in Mexico and six in South America. Of the South American ones, the type of the genus, *C. sericeus*, may extend into Central America, and is included in the following enumeration :

Key to the North American species

Foliage densely pubescent.

Inflorescence few-flowered on short peduncles. Mexican. 1. *C. velutinus*.

Inflorescence many-flowered on long leafy peduncles. South

American.

2. *C. sericeus*.

Foliage glabrous or nearly so. Mexican.

3. *C. Pringlei*.

1. *Calycobolus velutinus* (Mart. & Gal.)

Prevostea velutina Mart. & Gal. Bull. Acad. Brux. 12²: 259. 1845.

Breweria mexicana Hemsley, Biol. Cent. Am. Bot. 2: 400. 1882.

Porana velutina Hallier f. Bot. Jahrb. 16: 538. 1893.

Softly pubescent, more or less erect and slender; leaf-blades oblong-lanceolate, thick, 5–7 cm. long, acute, the base obtuse or rounded; petioles 8–10 mm. long; peduncles about 2 cm. long, few-flowered: the three outer sepals about 15 mm. long, ovate, obtuse, glabrous at maturity, the two inner sepals subscarious and much smaller; corolla 2–2.5 cm. long, sparingly hirsute without; anthers oblong; ovary villous.

TYPE LOCALITY: "In Mexico inter Tehuacan et Oaxacan prope la Venta de Argon."

DISTRIBUTION: Southern Mexico.

2. *Calycobolus sericeus* (H.B.K.)

Dufourea sericea H.B.K. Nov. Gen. & Sp. 3: 114. pl. 114. 1818.

Calycobolus emarginatus Willd.; R. & S. Syst. 5: 4. 1819.

Reinwardtia sericea Spreng. Syst. 1: 863. 1825.

Prevostea sericea Choisy, Ann. Sci. Nat. 4: 496. 1825.

Distinguished from *C. velutinus* by its leaf-blades sericeous-pubescent beneath, the flower clusters ample and terminating leafy branches, and the colored outer sepals.

TYPE LOCALITY: "Crescit in Regno Novae Granatae, juxta urbem Mariquita, alt. 400 hex."

DISTRIBUTION: Northern South America.

3. ***Calycobolus Pringlei* sp. nov.**

Twining, 5 meters high, herbaceous above, woody below; glabrous except for some minute pubescence on the pedicels and at the base of the sepals; leaf-blades broadly lanceolate or oblong-lanceolate, acute, obtuse or rounded at the base, 4–8 cm. long, glabrous, texture somewhat rough and thick; petioles short, 5–10 mm. long; flowering branches one or more in the axils of the leaves, branching, many-flowered, leafy; pedicels 7–10 mm. long; the three outer sepals elliptical, rounded at the apex, 8–10 mm. long, the two inner ones 3 mm. long or less; corolla 1.5 cm. long and as broad, slightly pubescent in bud, becoming glabrous, deeply 5-lobed, lobes obovate, retuse; anthers short-sagittate, blunt.

MEXICO: On limestone hills, Yantepec, Morelos, alt. 4000 feet, *C. G. Pringle* 8751, November 21, 1903 (type, sheet no. 460794 in the Herbarium of the United States National Museum). Puebla, between Huajuapam, Oaxaca and Retlatzingo, *E. W. Nelson* 1987, November 19, 1894, alt. 4800–6500 feet.

The South American species in addition to *C. sericeus*, above mentioned, are as follows:

***Calycobolus amazonicus* (Choisy)**

Prevostea amazonica Choisy, in DC. Prodr. 9: 437. 1845.

***Calycobolus ferrugineus* (Choisy)**

Prevostea ferruginea Choisy, Ann. Sci. Nat. 4: 498. 1825.

***Calycobolus glaber* (H.B.K.)**

Dufourea glabra H.B.K. Nov. Gen. & Sp. 3: 114. 1818.

Calycobolus pulchellus Willd.; R. & S. Syst. 5: 4. 1819.

Reinwardtia glabra Spreng. Syst. 1: 863. 1825.

Prevostea glabra Choisy, Ann. Sci. Nat. 4: 496. 1825.

***Calycobolus spectabilis* (Meissn.)**

Prevostea spectabilis Meissn. in Mart. Fl. Bras. **7**: 325. 1869.

***Calycobolus umbellatus* (Choisy)**

Prevostea umbellatus Choisy, Ann. Sci. Nat. **4**: 496. 1825.

2. BONAMIA Pet. Thouars, Hist. Veg. Afr. **1**: 17, 32.

pl. 5. 1804 — J. St. Hil. Expos. Fam. **2**: 349. 1805.

Stout, spreading, herbaceous or sometimes woody or twining plants. Leaves herbaceous or subcoriaceous, rarely cordate. Sepals leathery or coriaceous, equal or nearly so, usually obtuse or rounded. Corolla large or medium-sized, white or blue, hirsute without on the plicae, the limb subentire. Filaments glandular-villous below. Ovary 2-celled, 4-ovuled. Style bifid nearly to the base, the divisions unequal; stigmas 2, globose. Capsules chartaceous, 4-valved. Seeds smooth, or pubescent on the dorsal angles.

Type species: *Bonamia alternifolia* J. St. Hil.

Breweria R. Br. Prodr. **1**: 487. 1810.

Trichantha Karst. & Triana, Linnaea **28**: 437. 1856.

About 30 species, chiefly in the tropics of the old world.

Key to the North American species

Sepals about 12 mm. long. Southwestern U. S.

1. *B. ovalifolia*.

Sepals 20 mm. long or longer; corolla 9–10 cm. long. Floridian. 2. *B. grandiflora*.

1. BONAMIA OVALIFOLIA (Torr.) Hallier f. Bot. Jahrb. **16**: 528.
1893

Evolvulus ovalifolia Torr. Bot. Mex. Bound. 150. 1859.

Breweria ovalifolia A. Gray, Syn. Fl. N. Am. **2**: 217. 1878.

TYPE LOCALITY: Mexican side of the Rio Grande below San Carlos.

DISTRIBUTION: Arid regions of the Mexican boundary, Texas to New Mexico.

2. BONAMIA GRANDIFLORA (A. Gray) Hallier f. Bull. Herb. Boiss.
5: 810. 1897

Breweria grandiflora A. Gray, Proc. Am. Acad. **15**: 49. 1880.

TYPE LOCALITY: Manatee and Sarasota, Florida.

DISTRIBUTION: In sandy soil, Florida.

The treatment of the genus *Stylisma* Raf. by various American authors has been the successive adoption of *Stylisma*, *Bonamia* and *Breweria*, as the generic name of these plants. Dr. Gray first used *Stylisma*, and later took up *Bonamia* and *Breweria* successively. The first edition of Chapman's Flora places the species under *Stylisma*, but in the latter editions *Breweria* is adopted. All of these changes seem to be due to the fact that the Australian genus described by Brown has about the same character of style and ovary. A most important fact however seems to have been overlooked by those who have joined the American species of *Stylisma* to *Breweria*, and that is that the genus *Breweria* possesses a totally different habit and has comparatively stout, firm stems and branches, thick, firm or leathery obtuse or rounded sepals, points which serve to sharply separate the species of *Stylisma* from *Breweria*. As has been shown by Hallier,* the genus *Breweria* R. Br. is congeneric with *Bonamia* Thouars.

3. *STYLISMA* Raf. Neogenyt. 2. 1825. — Fl. Tellur. 4: 55.
1836

Perennial, slender, weak, prostrate or somewhat twining plants, herbaceous above. Leaf-blades narrow or broad, entire, not cordate. Flowers 1–3, on axillary peduncles. Calyx pubescent or glabrous. Sepals equal or nearly so, herbaceous, pointed, somewhat united at the base. Corolla white, rotate or subfunneliform, the limb plaited, 5-angled or 5-lobed. Filaments filiform. Ovary 2-celled, 4-ovuled. Style divided nearly to the base, the divisions nearly equal. Stigmas 2, capitate. Capsules thin-walled, 2-celled, 2–4-valved. Seeds 2–4, glabrous or minutely pubescent.

Type species: *Stylisma peduncularis* Raf. = *Convolvulus humistratus* Walt. = *Stylisma humistrata* Chapm.

Six species in the southeastern United States and one in northern Mexico.

Key to the North American species

Sepals glabrous or merely ciliate.

Leaf-blades narrowly linear.

1. *S. angustifolia*.

Leaf-blades oblong.

2. *S. humistrata*.

Sepals distinctly pubescent.

Filaments pubescent.

Foliage sparingly pubescent; mature peduncles 1–3 cm.
long; corolla 1.5 cm. long.

3. *S. trichosanthes*.

* Bot. Jahrb. 16: 527, 573. 1893. — Bull. Herb. Boiss. 5: 804. 1897.

- Foliage densely brown-tomentose ; mature peduncles 4–6 cm. long ; corolla 2 cm. long. 4. *S. villosa*.
 Filaments glabrous or nearly so.
 Peduncles as long as the leaves or exceeding them.
 Bracts exceeding the flowers ; leaves linear. 5. *S. Pickeringii*.
 Bracts not exceeding the flowers ; leaves oblong to narrowly lanceolate. 6. *S. aquatica*.
 Pedicels sessile in the axils and shorter than the round-ovate leaves. 7. *S. rotundifolia*.

1. ***Stylisma angustifolia*** (Nash)

Breweria angustifolia Nash, Bull. Torrey Club **22**: 155. 1895.
 TYPE LOCALITY: Near Eustis, Florida.
 DISTRIBUTION: Sandy soil in high pine lands, Florida.

2. ***STYLISMA HUMISTRATA*** (Walt.) Chapm. Fl. Southern U. S. 346. 1860

Convolvulus humistratus Walt. Fl. Car. 94. 1789.
Convolvulus tenellus Desv. ; Lam. Encyl. **3**: 559. 1789. — Ell. Bot. S. C. & Ga. **1**: 215. 1817.
Convolvulus Sherardi Pursh, Fl. Am. Sept. **2**: 30. 1814.
Stylisma convolvuloides Choisy, Mém. Soc. Phys. Genève. **6**: 494. 1833.
Stylisma peduncularis Raf. Fl. Tellur. **4**: 55. 1836.
Breweria Choisyana Steud. Nom. ed. 2. **1**: 224. 1840.
Bonamia humistrata A. Gray, Man. ed. 5. 376. 1867.
Breweria humistrata A. Gray, Syn. Fl. N. Am. **2**: 217. 1878.
Breweria tenella Peter, in Engler & Prantl, Natürl. Pflanzenfam. **4**^{3a}: 16. 1901.
 TYPE LOCALITY: Carolina.
 DISTRIBUTION: Sandy soil, Virginia to Florida and Louisiana.

3. ***Stylisma trichosanthes*** (Michx.)

Convolvulus trichosanthes Michx. Fl. Bor. Am. **1**: 137. 1803.
Breweria trichosanthes Small, Fl. Southeastern U. S. 939. 1903.
 TYPE LOCALITY: Carolina.
 DISTRIBUTION: Sandy soil, North Carolina to Florida and Alabama.

4. **Stylisma villosa** (Nash)

Breweria villosa Nash, Bull. Torrey Club **22** : 159. 1895.

TYPE LOCALITY : Near Eustis, Florida.

DISTRIBUTION : Dry soil, peninsular Florida.

5. **STYLISMA PICKERINGII** (M. A. Curtis) A. Gray, Man. ed. 2.
335. 1856.

Convolvulus Pickeringii M. A. Curtis, Bost. Jour. Nat. Hist. **1** :
129. 1837.

Stylisma evolvuloides var. *angustifolia* Choisy, in DC. Prodr. **9** :
450. 1845.

Bonamia Pickeringii A. Gray, Man. ed. 5. 376. 1867.

Breweria Pickeringii A. Gray, Syn. Fl. N. Am. **2** : 217. 1878.

TYPE LOCALITY : New Jersey.

DISTRIBUTION : Sandy pine regions, New Jersey to Florida,
Mississippi and Texas. Also reported from Illinois.

6. **STYLISMA AQUATICA** (Walt.) Chapm. Fl. Southern U. S. 346.
1860.

Convolvulus aquaticus Walt. Fl. Car. 94. 1788.

Convolvulus erianthus Willd.; Spreng. Syst. **1** : 610. 1825.

Bonamia aquatica A. Gray, Man. ed. 5. 376. 1867.

Stylisma elliptica Raf. Fl. Tellur. **4** : 55. 1836.

Breweria aquatica A. Gray, Syn. Fl. N. Am. **2** : 217. 1878.

TYPE LOCALITY : Carolina.

DISTRIBUTION : In pine lands, Virginia to Florida and Texas.

7. **Stylisma rotundifolia** (S. Wats.)

Breweria rotundifolia S. Wats. Proc. Am. Acad. **23** : 281. 1888.

Evolvulus rotundifolius Hallier f. Bot. Jahrb. **16** : 530. 1893.

TYPE LOCALITY : Chihuahua, Sierra Madre, Mexico.

DISTRIBUTION : In fields and thickets, pine plains, northern
Mexico. In general appearances this species has a striking sim-
ilarity to certain species of *Evolvulus*, especially *E. prostratus*
Robinson, but the style has only the two divisions, typical of
Stylisma.

CLEMSON COLLEGE, SOUTH CAROLINA.